Columbia Basin Leadership Training (COBALT)

COBALT 2026
October 6, 2026

Hydrographic Services

Presented by

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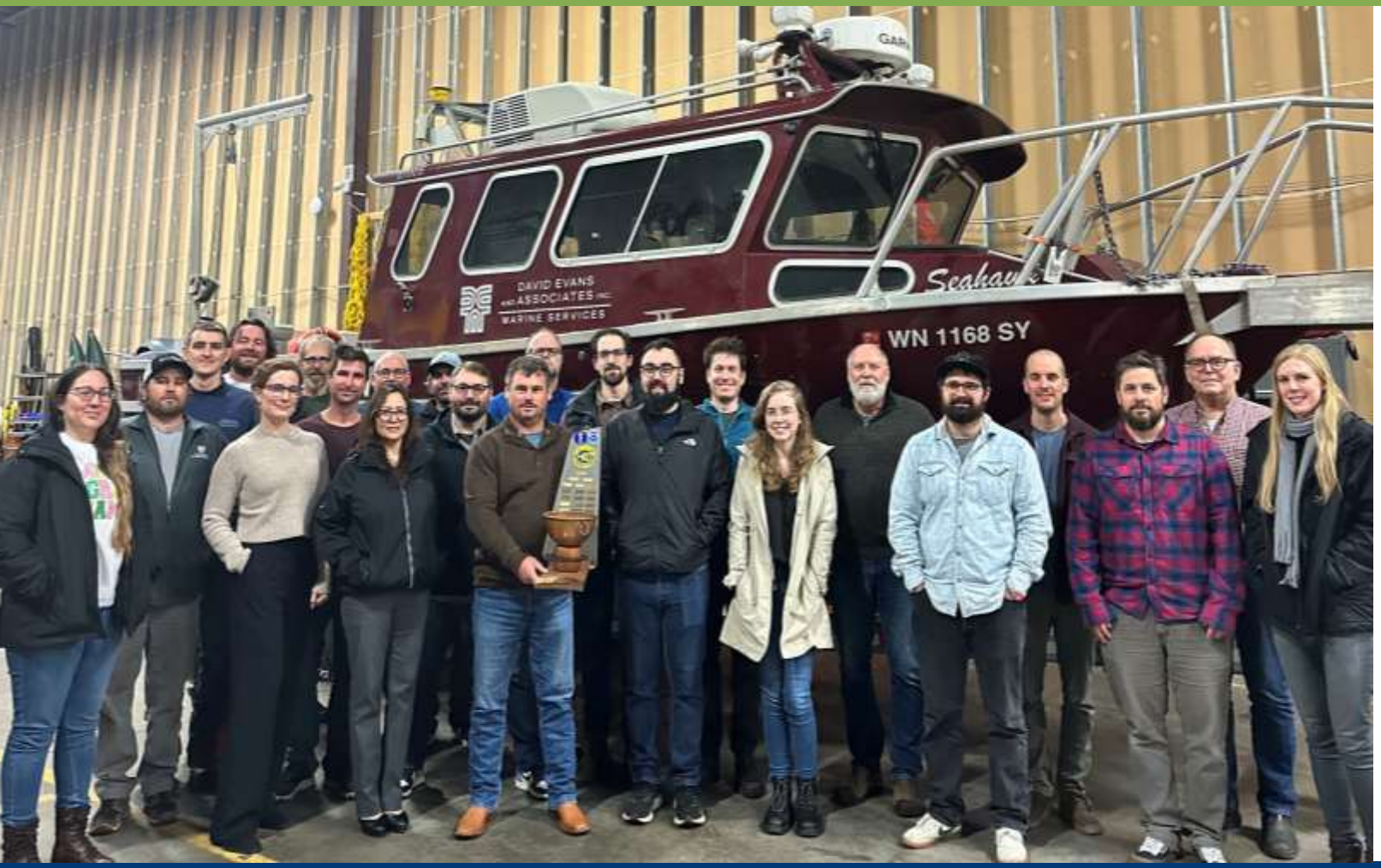
Senior Vice President

DAVID EVANS AND ASSOCIATES INC.
MARINE SERVICES

DEA Marine Services Division

Recognized leaders providing thought leadership to our clients.

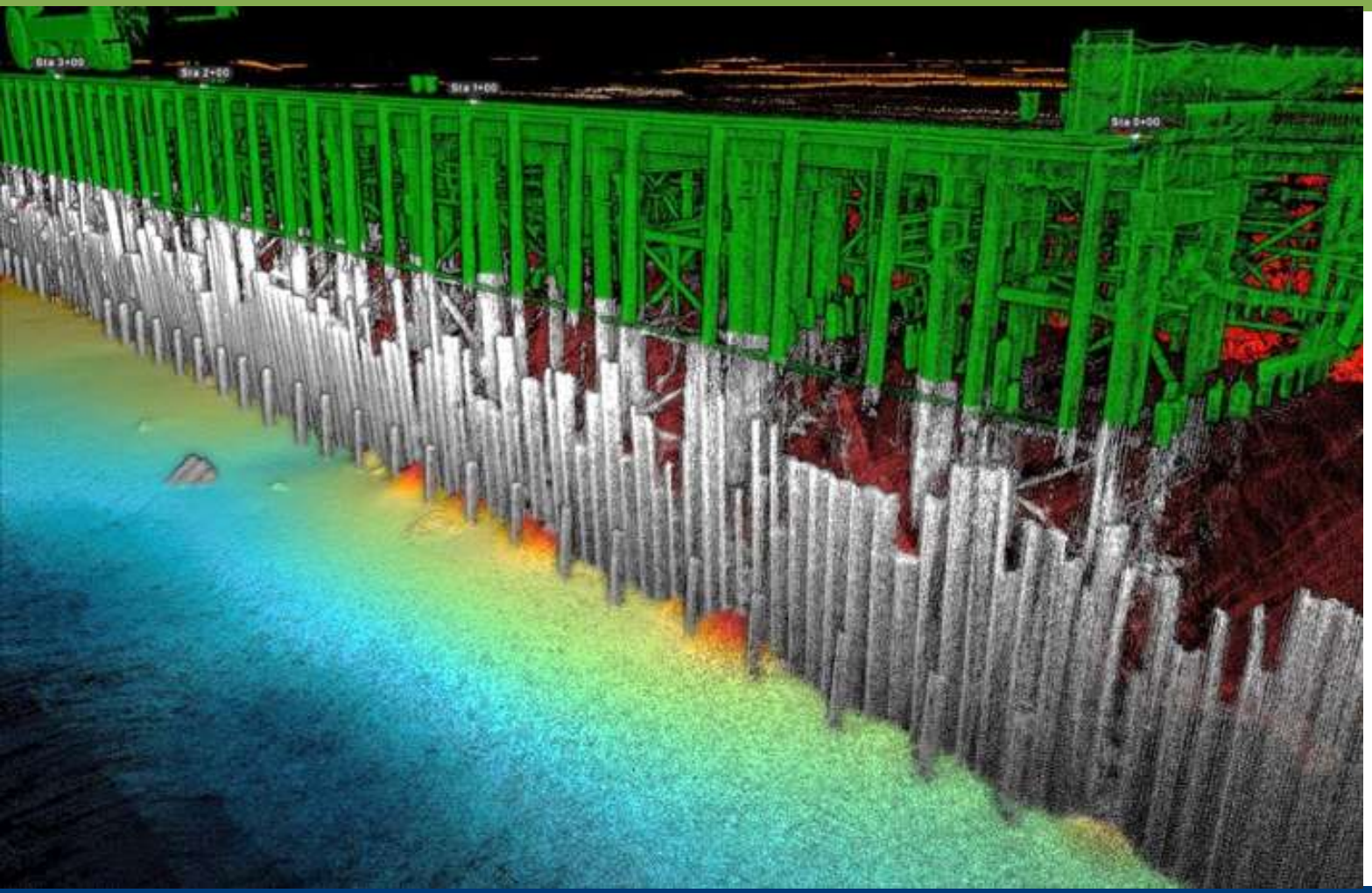


WHO WE ARE

- ✓ Surveyors
- ✓ Hydrographers
- ✓ Geophysicists
- ✓ Scientists
- ✓ Engineers
- ✓ GIS Analysts

DEA Marine Services Division

Headquartered in Vancouver, Washington



Services

- ✓ Hydrographic Surveys
- ✓ Marine Geophysical Surveys
- ✓ Ship Anchor Recovery
- ✓ Grounding Investigations
- ✓ Post-Incident Channel Clearance
- ✓ SAR
- ✓ Lost Container Recovery
- ✓ Air Draft Surveys/Monitoring
- ✓ Expert Witness

Purpose Built Vessels

Bathymetric and Marine Geophysical Survey Vessels

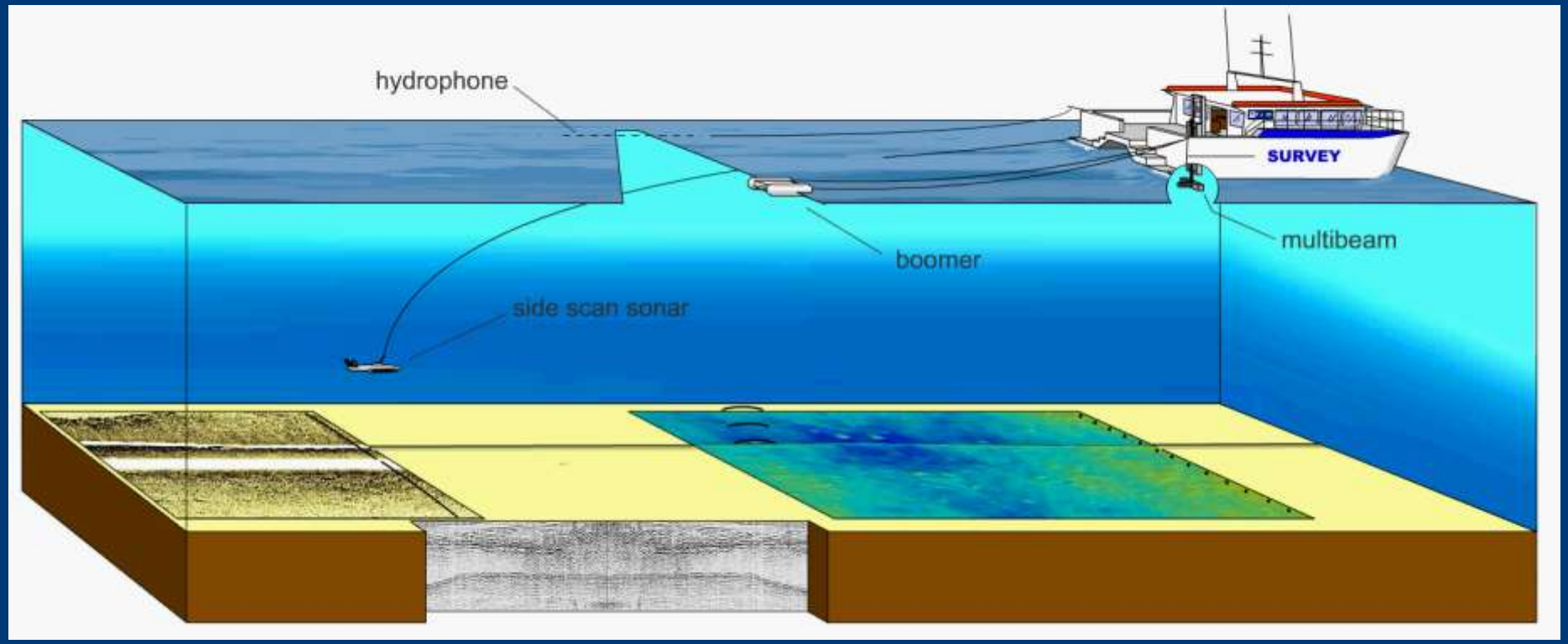
Seahawk

Richard T Brennan

Geophysical Survey Vessel

Vessels: *Richard T. Brennan*

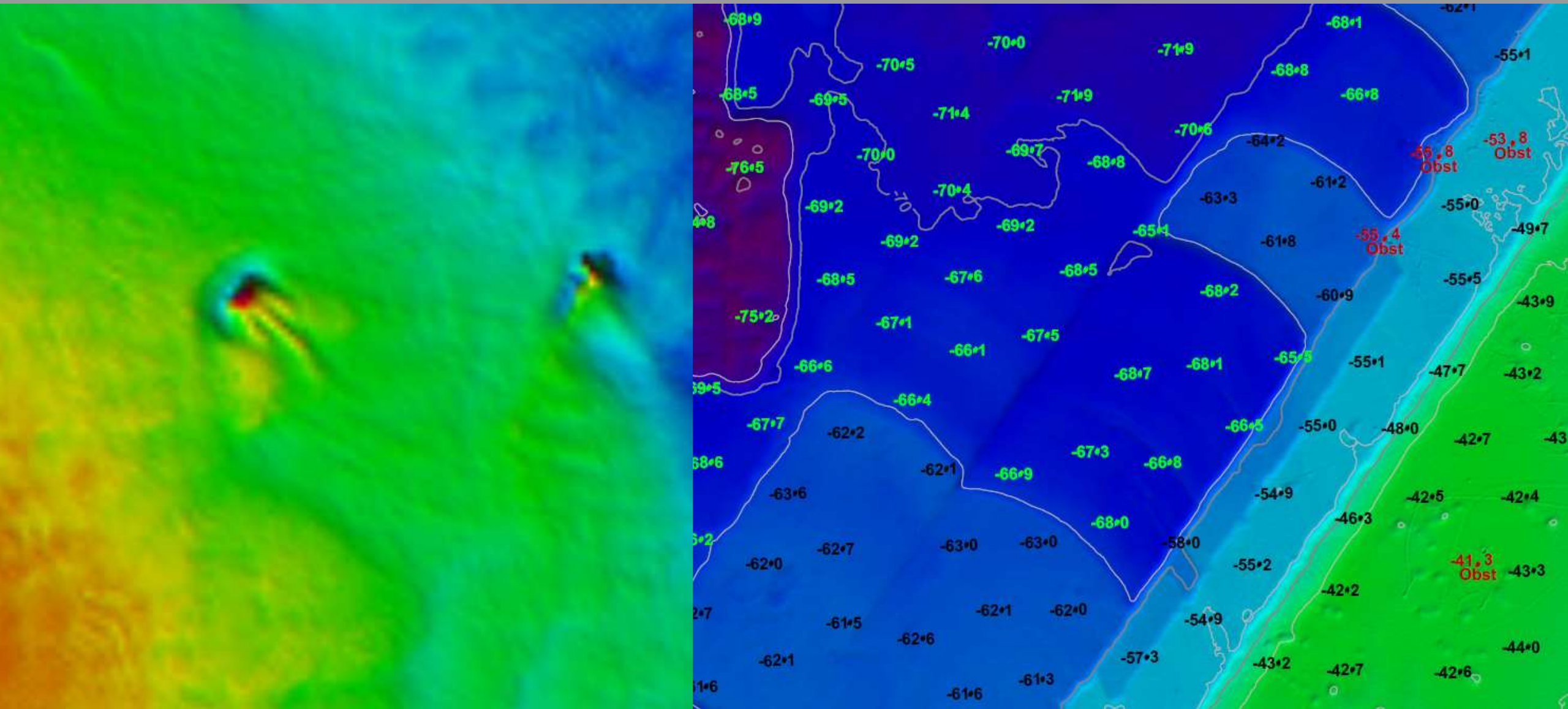
Instrumentation and Data Types



Multibeam Sonar: 3-Dimensional High-Resolution Data below water (Wide Swath)
Laser Scanner: 3-Dimentional Ultra-High-Resolution Data above water
Side Scan Sonar: 2-Dimesional Imagery (Wider Swath)
Sub-bottom Profiler: Map through fine sediments (Continuous Profile)
Seismic Reflection: Map geologic units (Continuous Profile)
Magnetometer: Culture resource mapping/ cable and pipeline locates (Continuous Profile)
Acoustic Doppler Current Profiler: Map current ocean/river current speed and direction (Continuous Profile)
Remotely Operated Vehicle (ROV): Video Imagery and/or Acoustic Scanning

INSTRUMENTATION: Multibeam Sonar

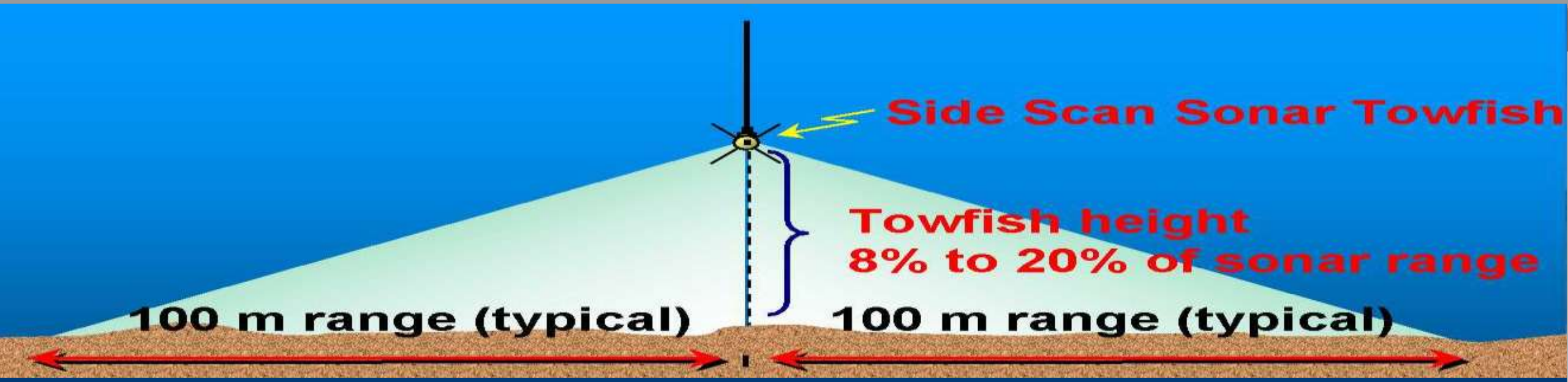
3D Bathymetric Mapping

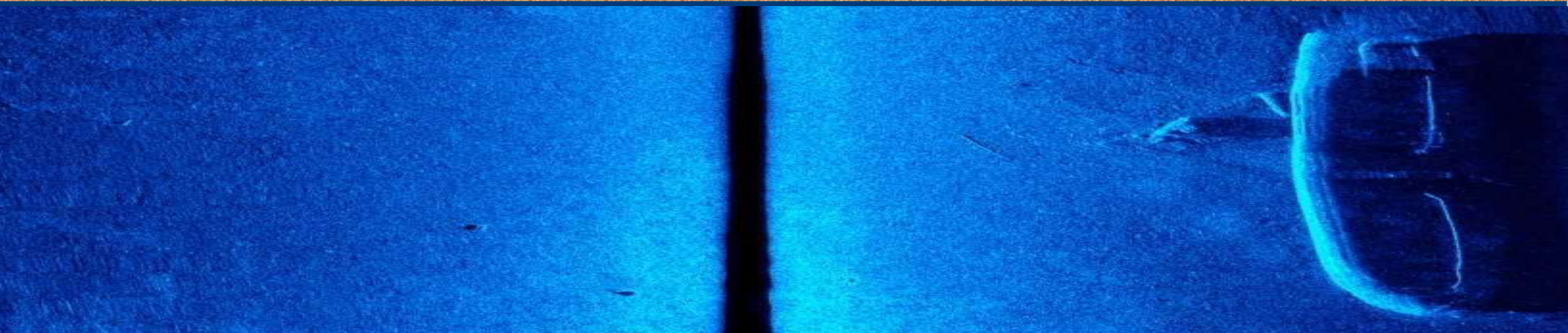


INSTRUMENTATION: Laser Scanner (Vessel Lidar)

3D Mapping Above Water

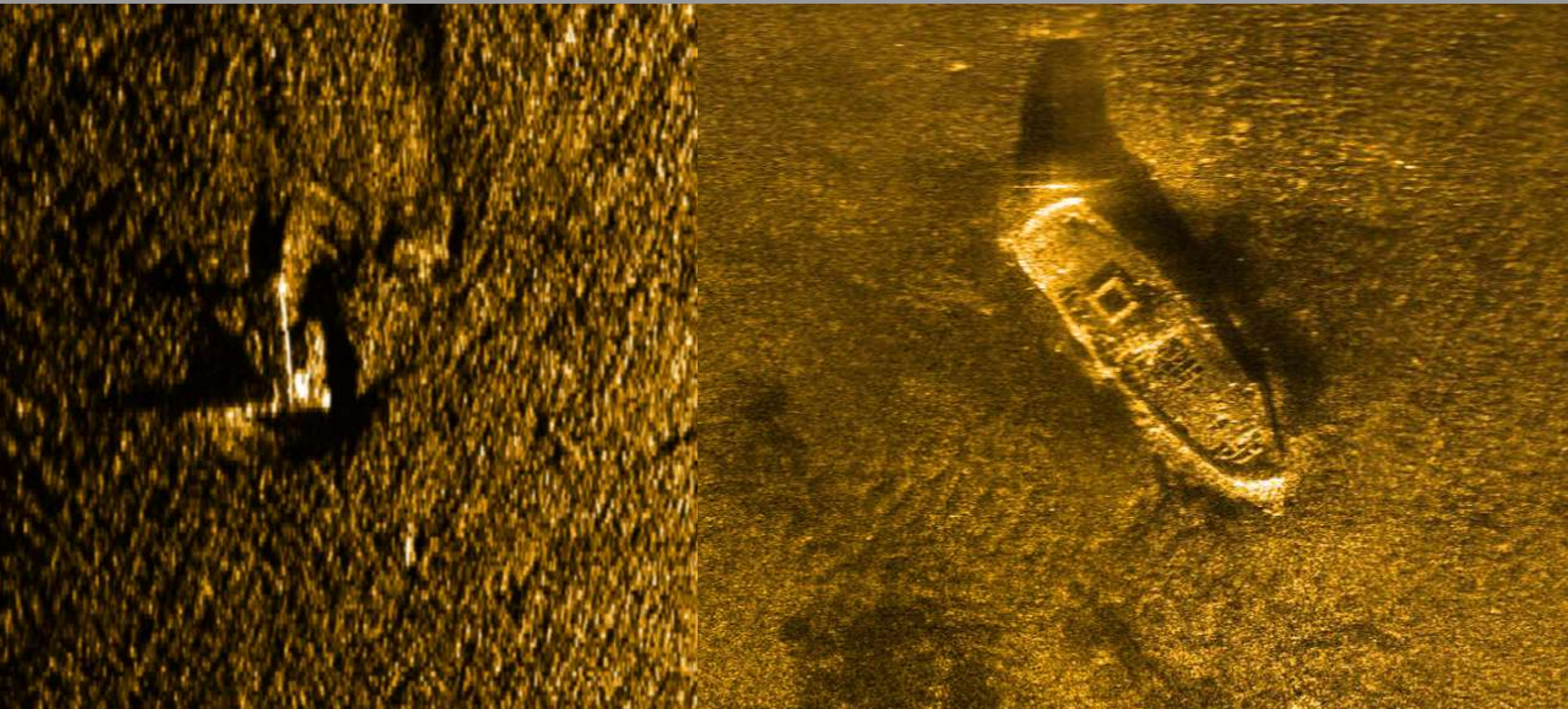
Wide Swath Bottom Imaging – Feature Detection



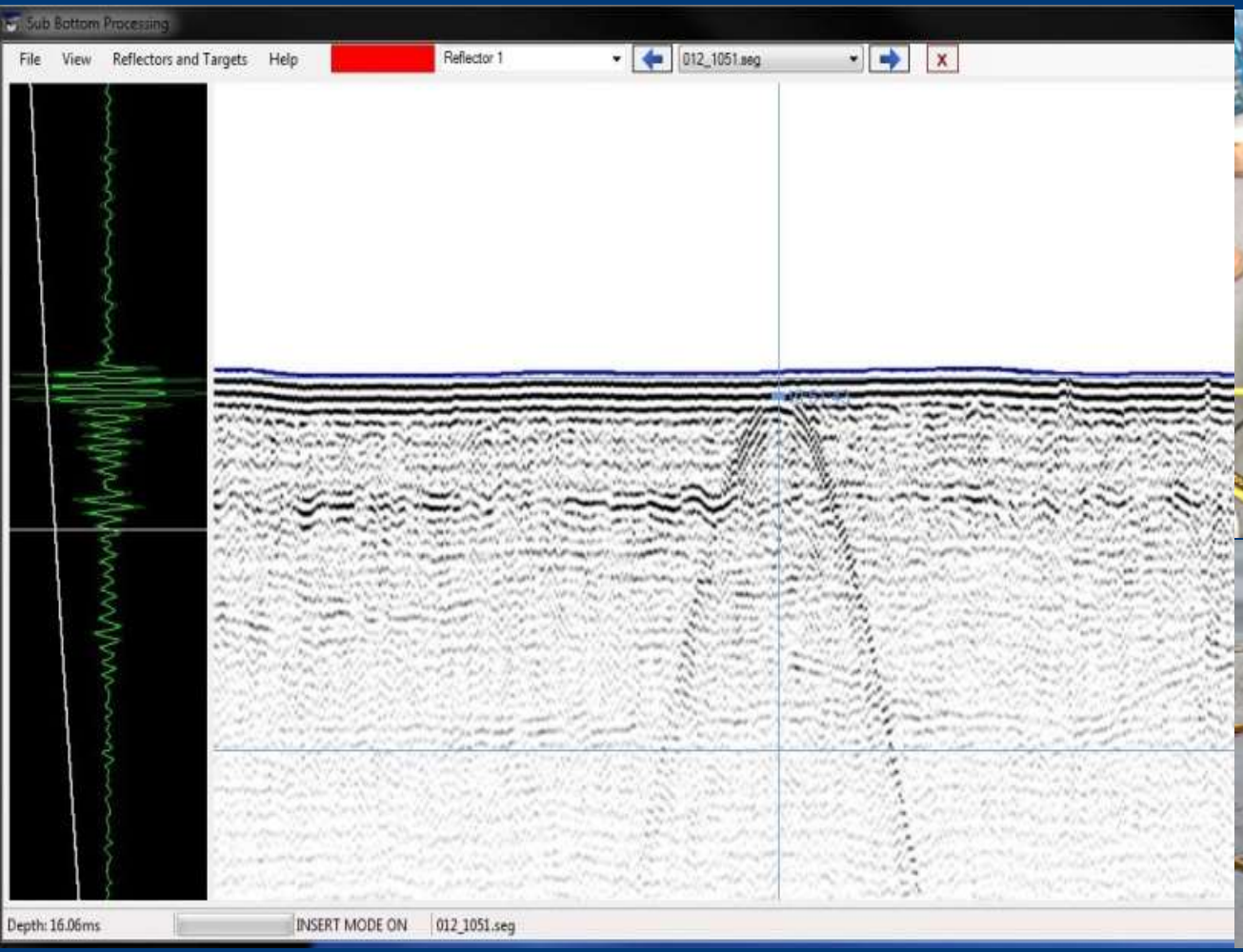


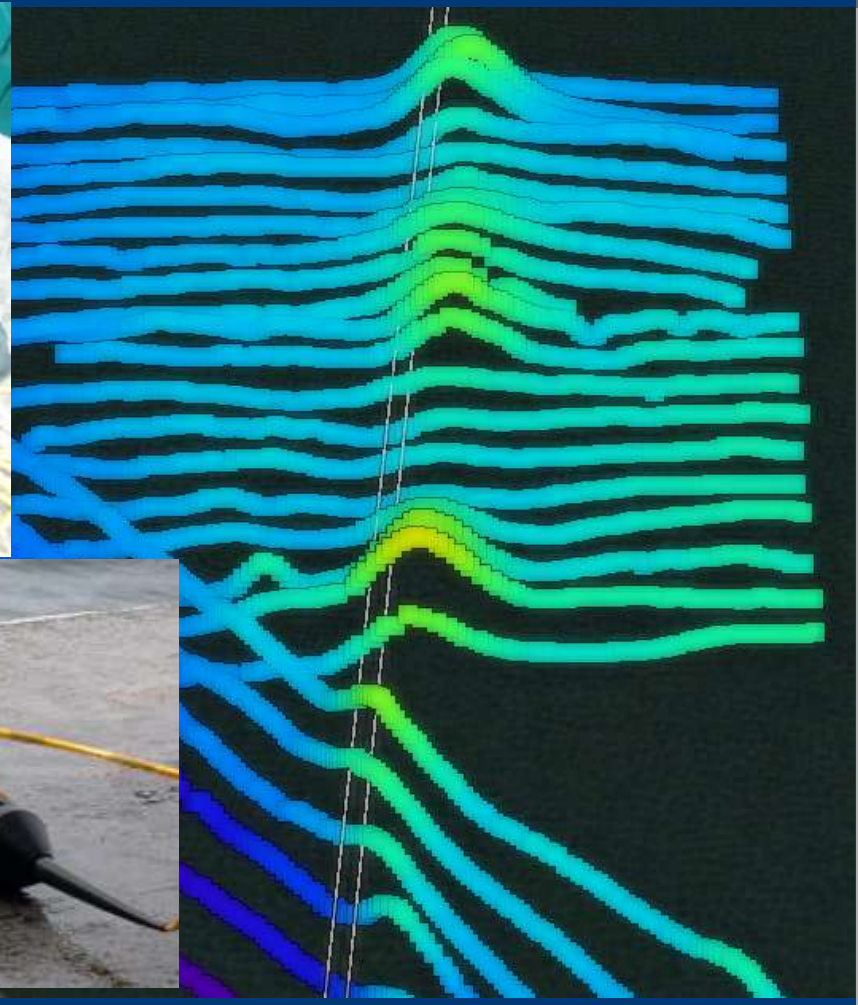
INSTRUMENTATION: Side Scan Sonar

Imagery of Features on Riverbed

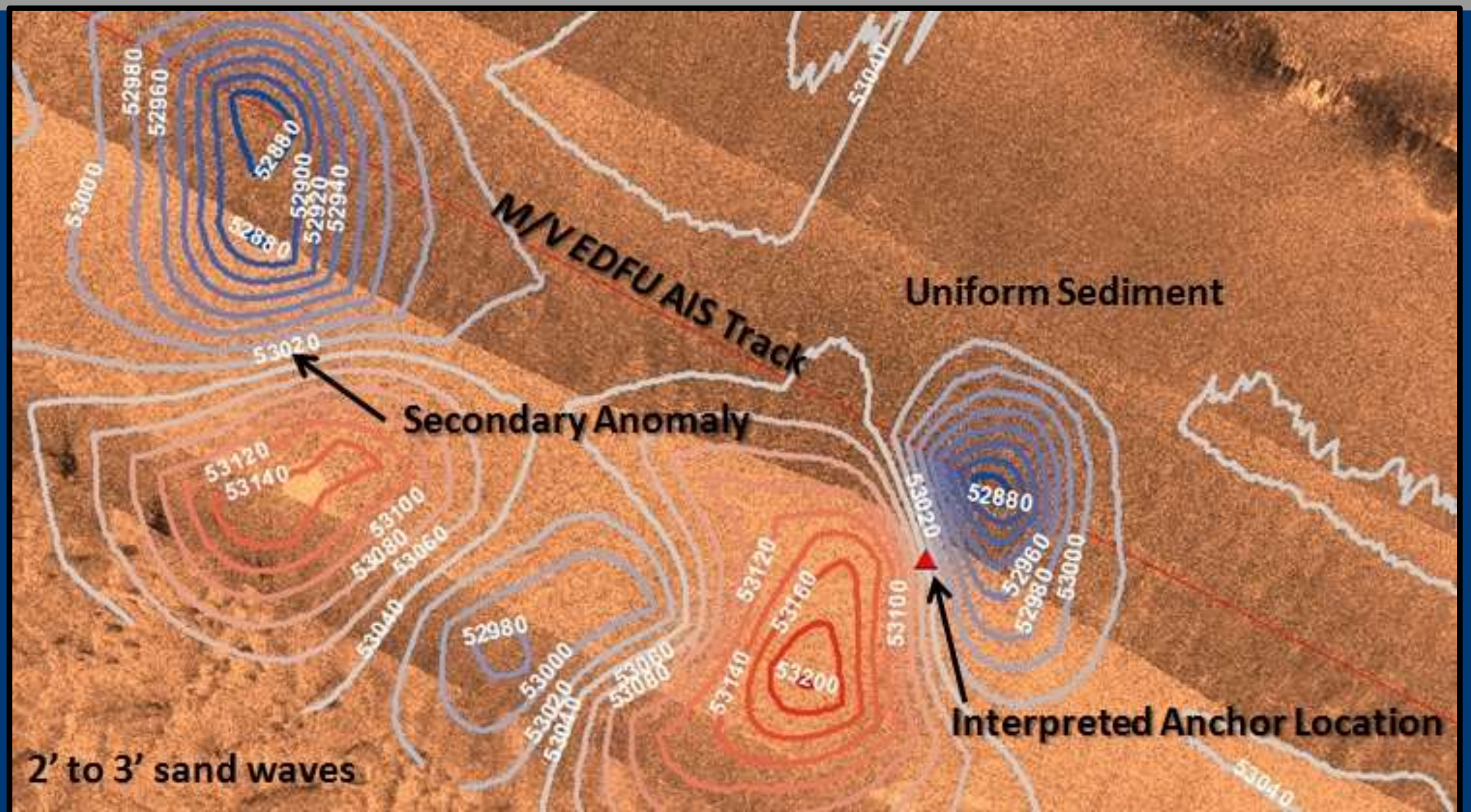


Sub-Bottom & Magnetometer Pipeline Mapping





Magnetic Signature of Buried Ship Anchors

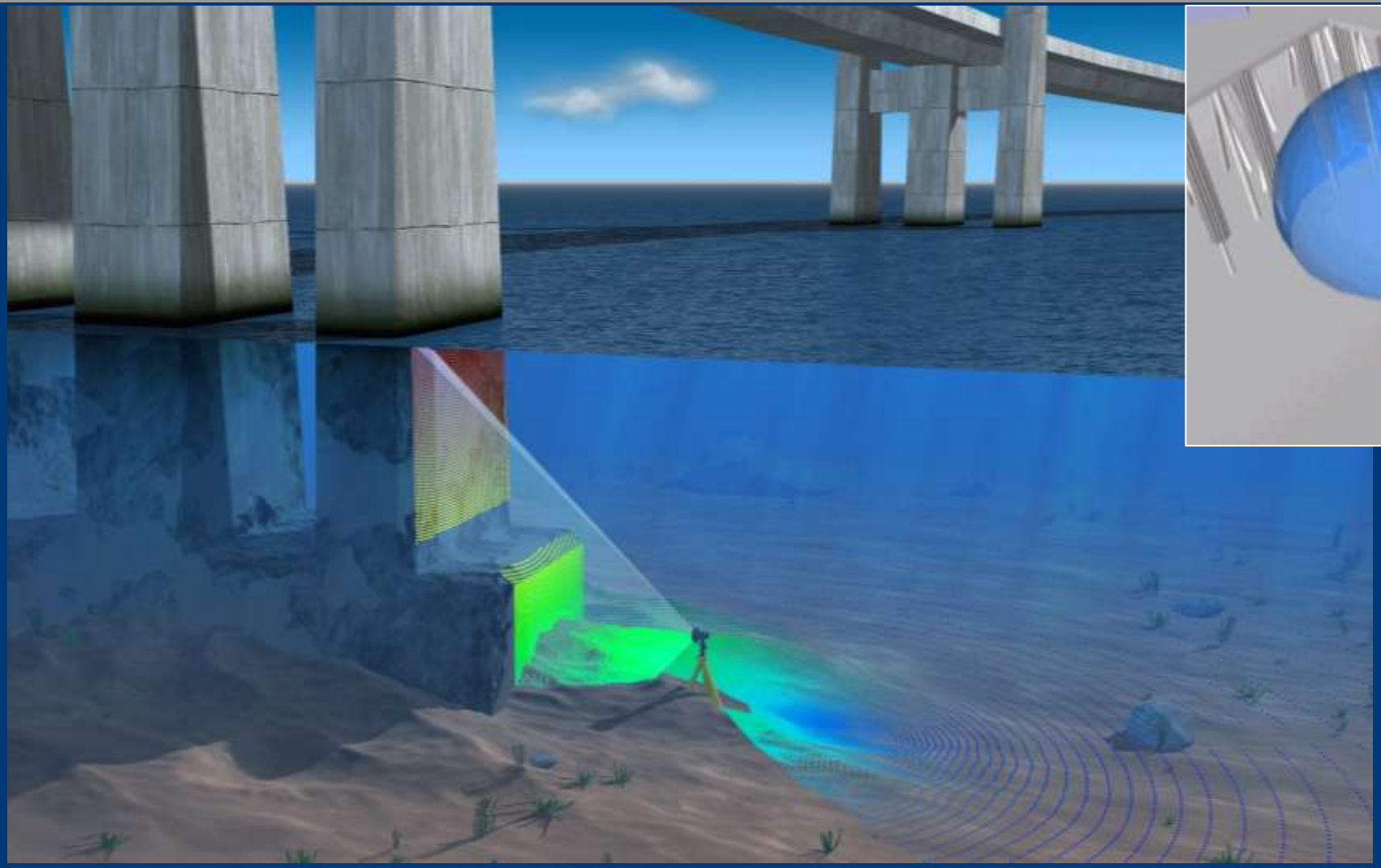


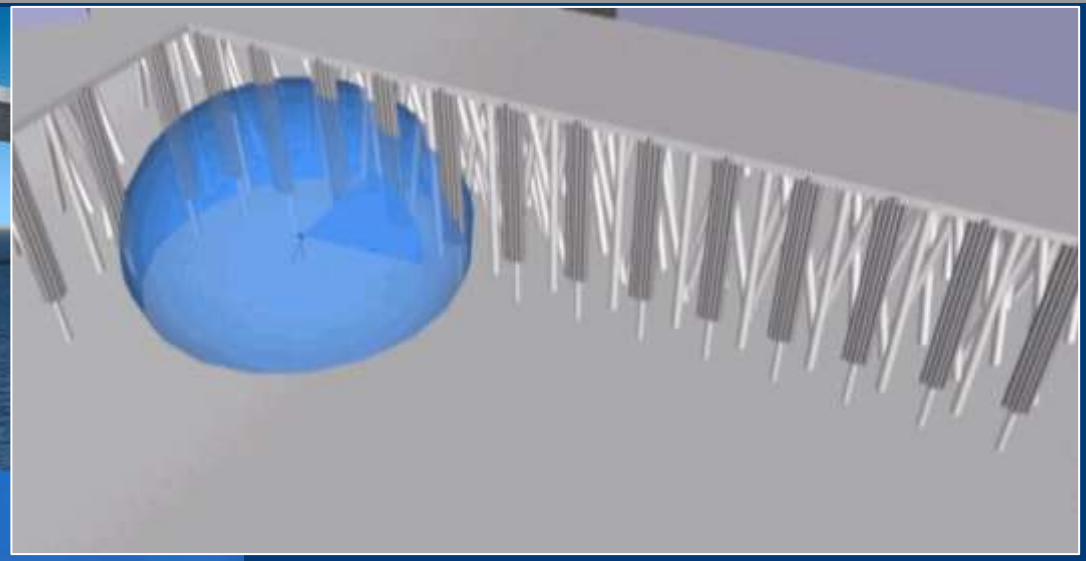
SERVICE: Anchor Search and Recovery

Positioning of Crane Barge and Sonar Positioning of Clam Shell for Anchor Recovery

INSTRUMENTATION: Blueview BV5000 Underwater Acoustic Scanner

High-Resolution Mapping

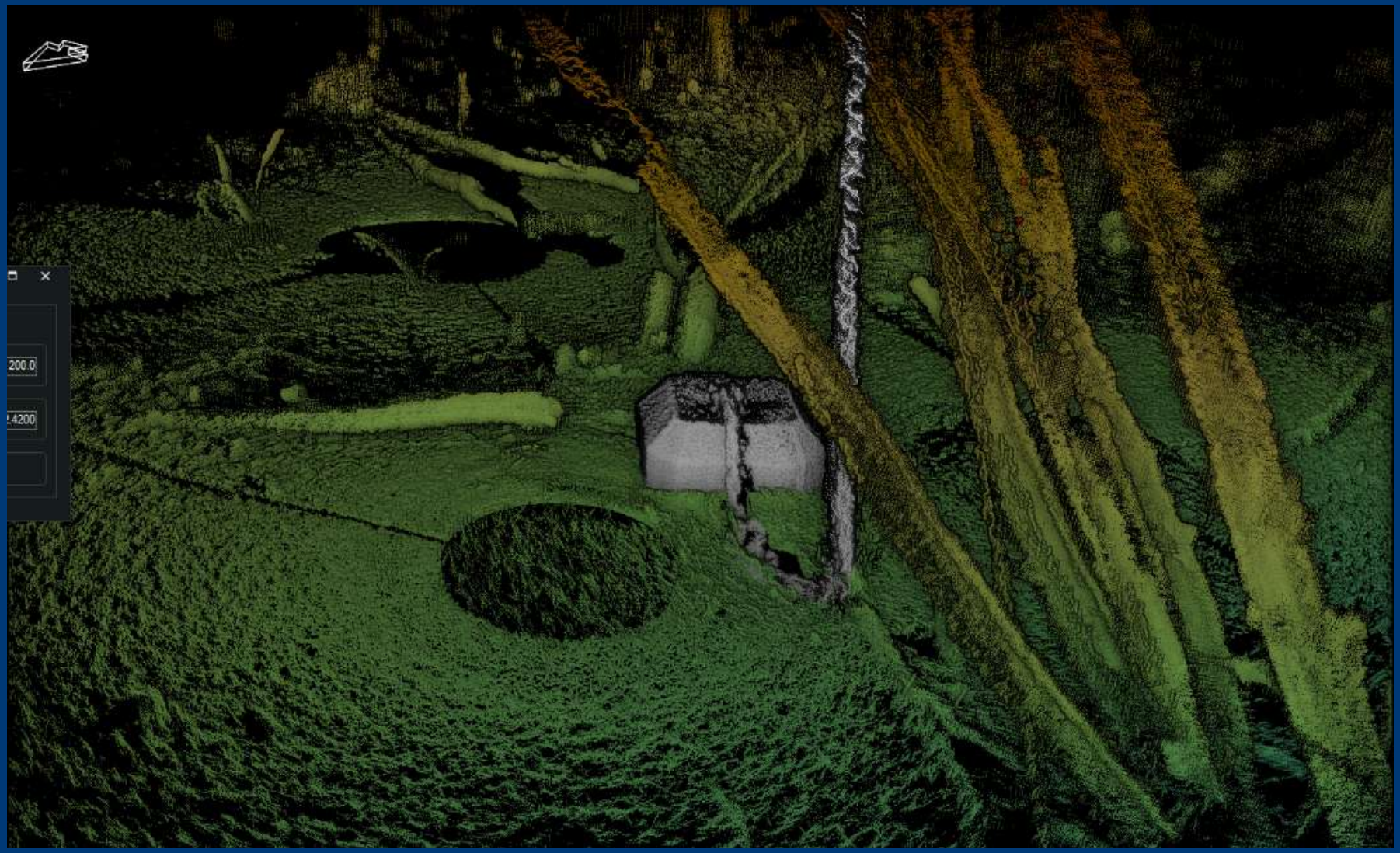




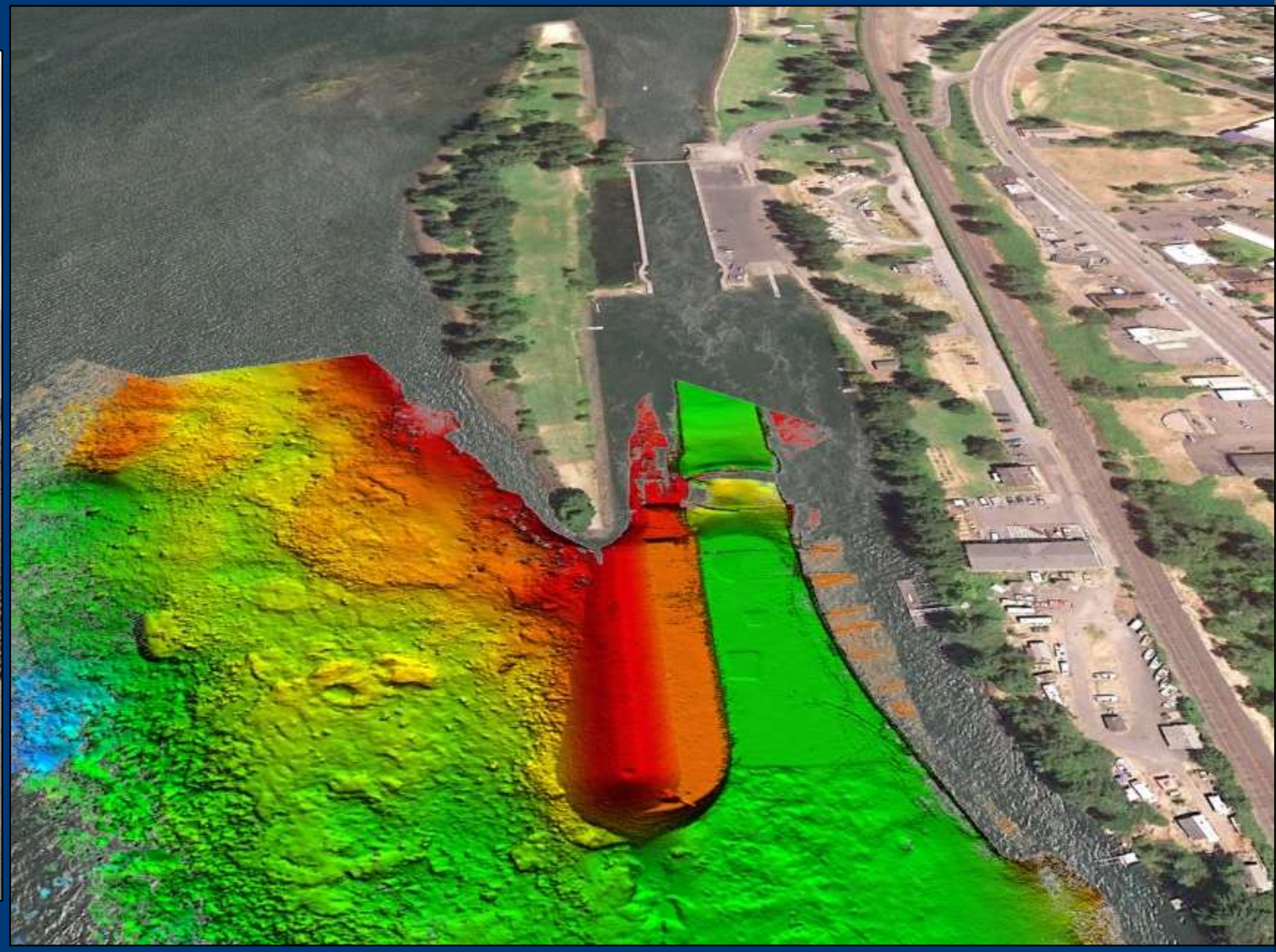
Acoustic Scanner: 3-Dimensional
High-Resolution Data (Short Range)
Bottom or Surface Deployed
Relative Positioning
Overlapping Spherical Scans for Composite Model
Readily Deployed
BlueView BV5000

INSTRUMENTATION: Blueview BV5000 Underwater Acoustic Scanner

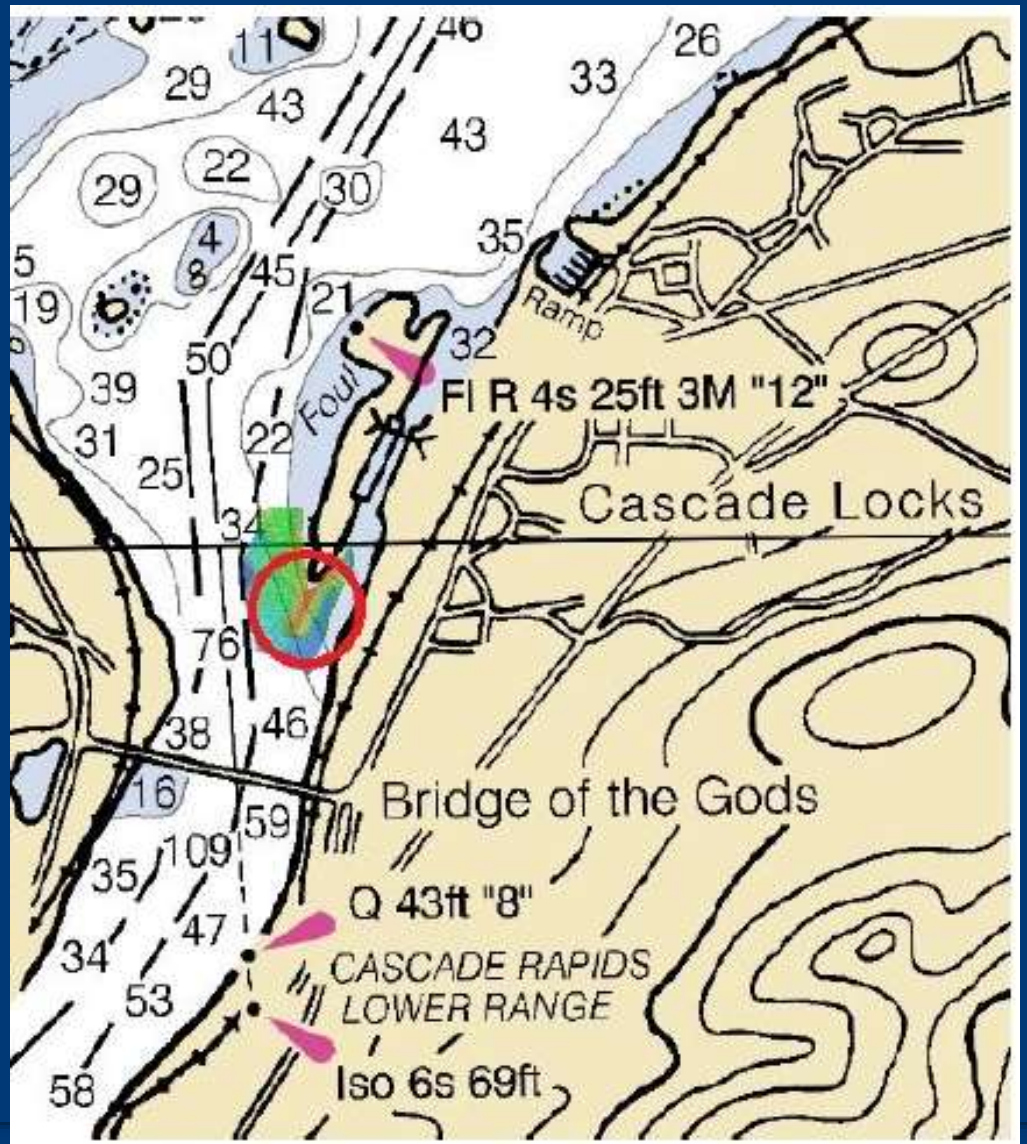
Anchor Block Inspection

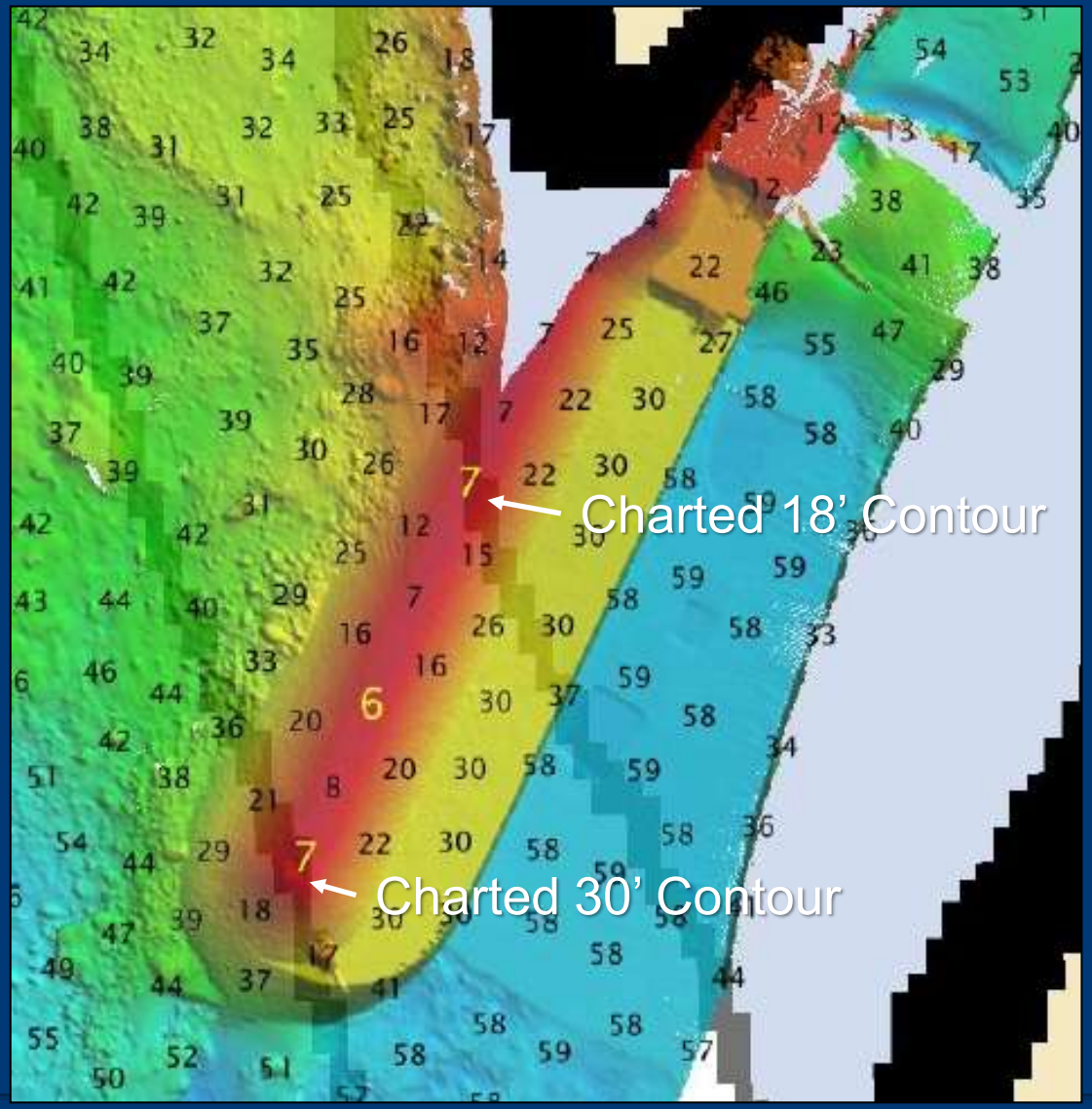


Old Cascade Locks Search and Recovery of Lost Ship Rudder

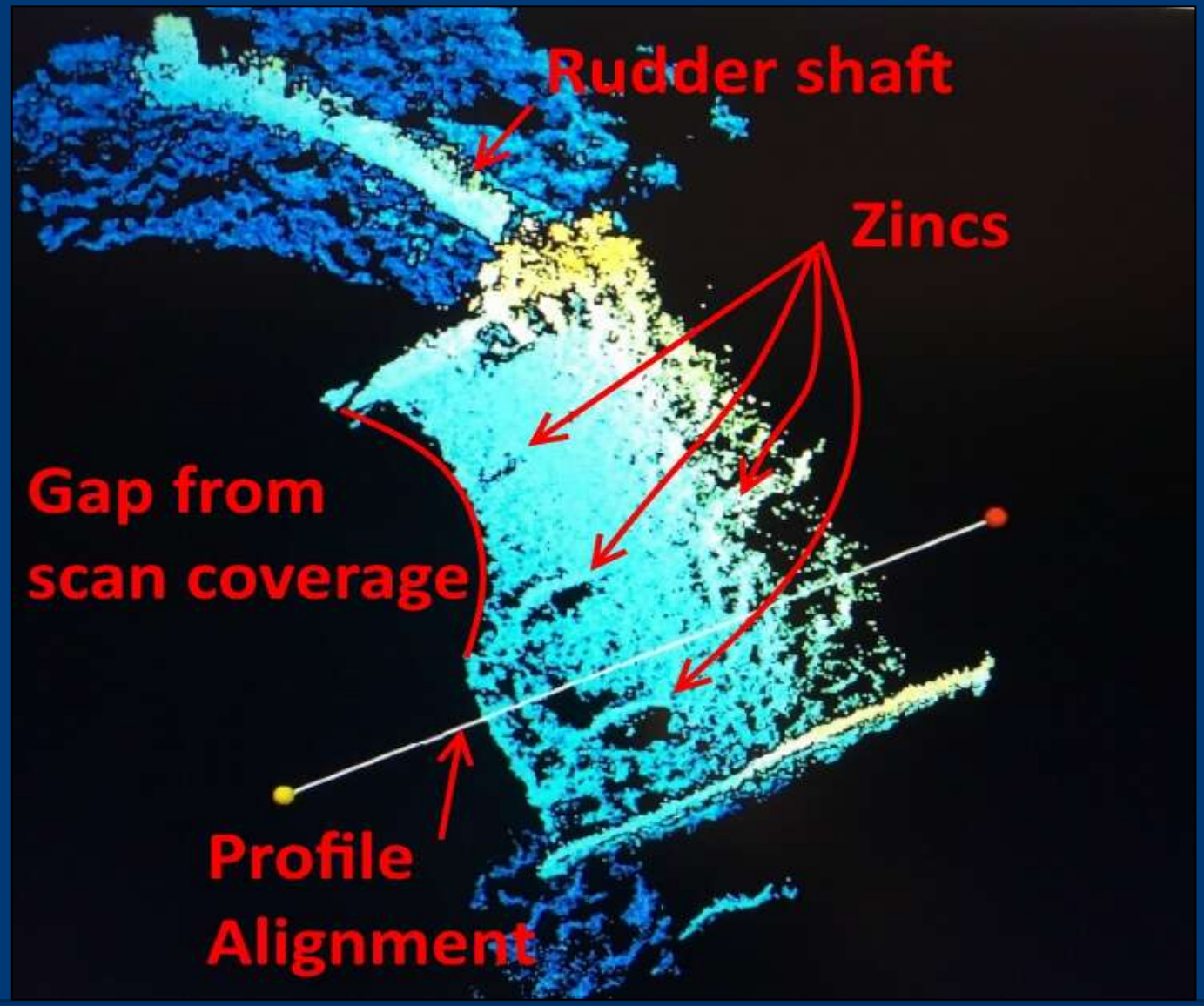


Uncharted Remains of Cascade Locks – Submitted as Danger to Navigation to NOAA



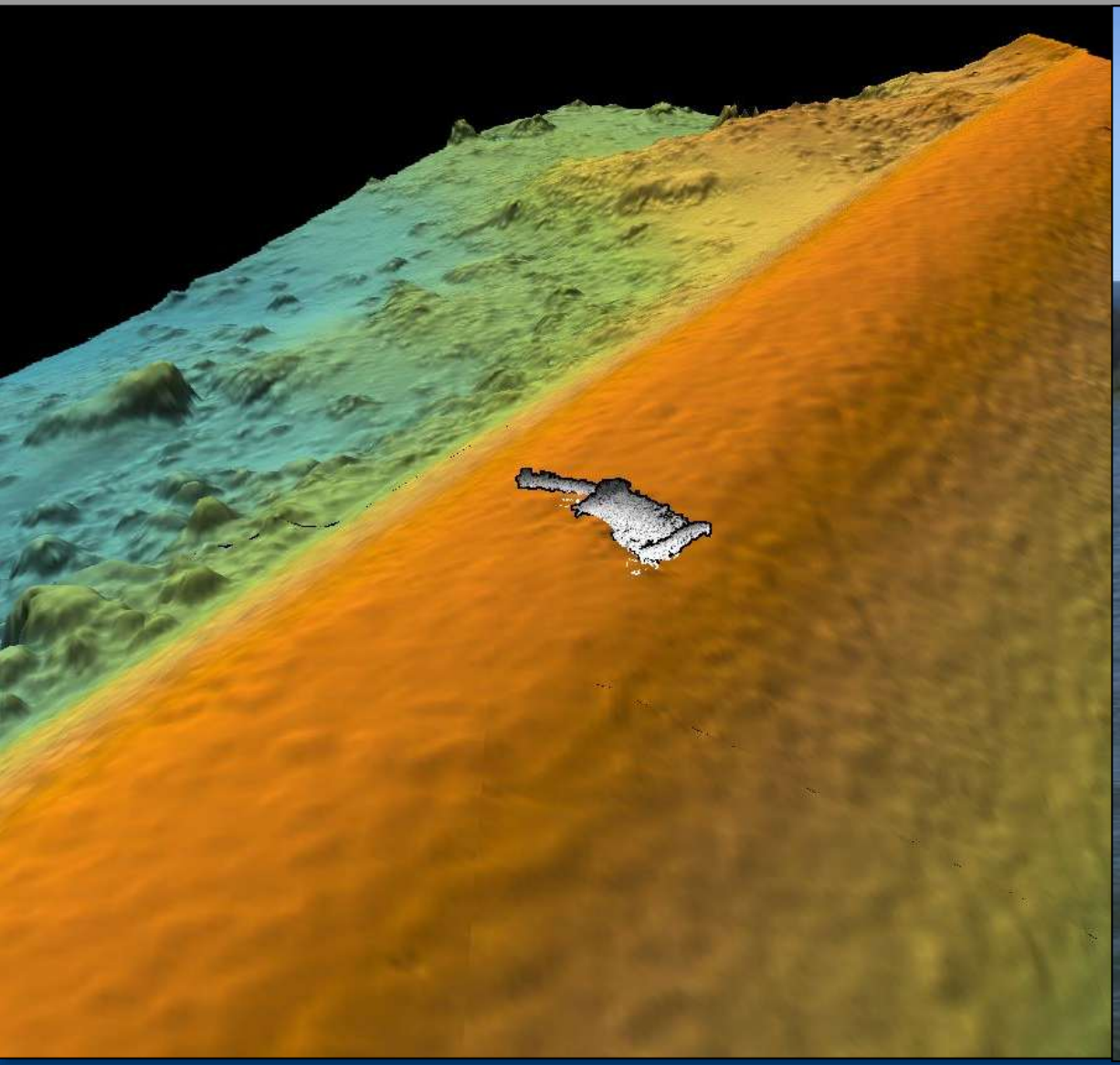


High Resolution Acoustic Scan of Rudder for Positive Identification and Position



SERVICE: Positioning Support for Recovery

Precision Positioning of Crane Barge and Boom for Recovery



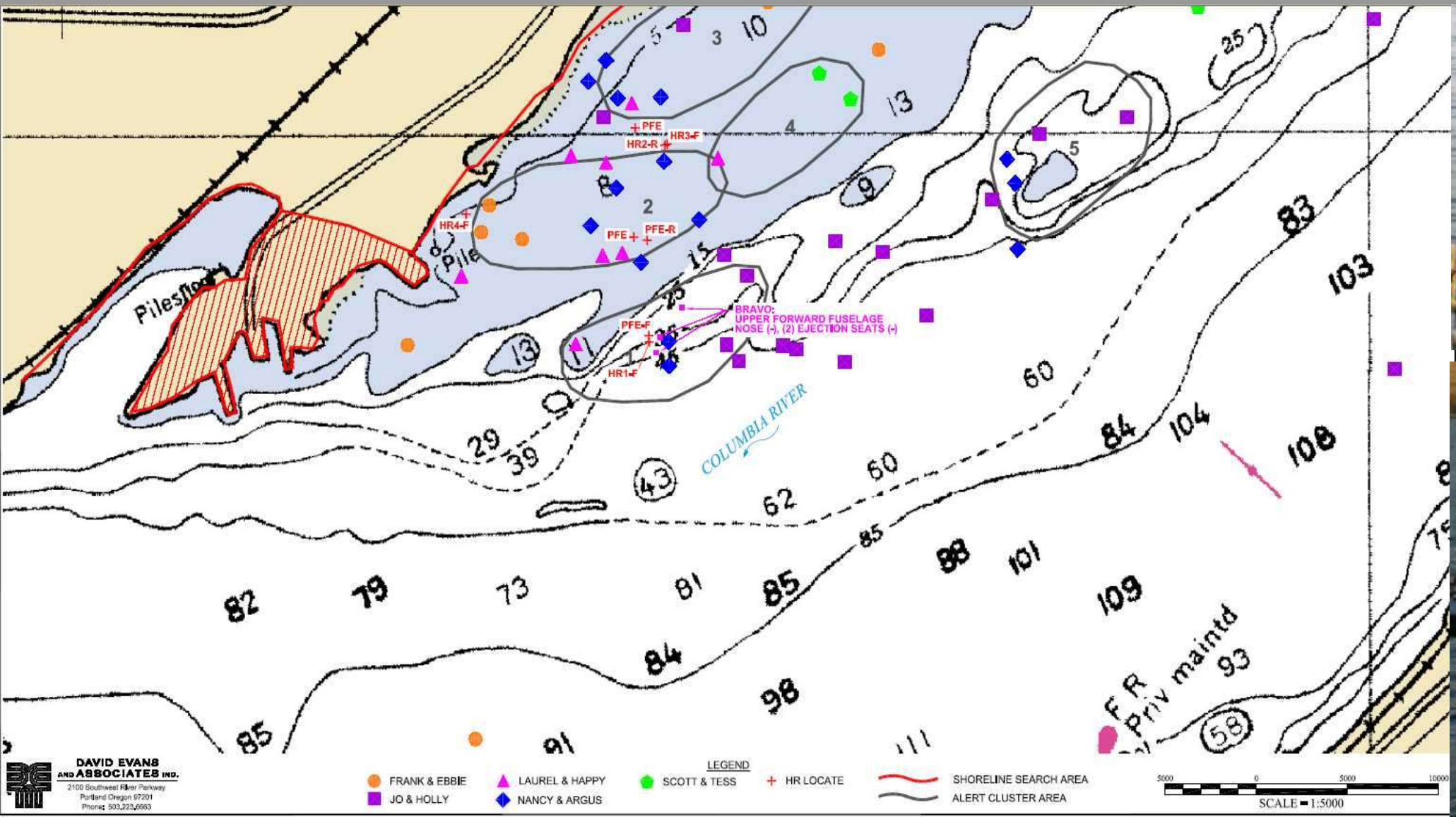
Services: Search and Recovery Operations – On-Scene Command Support

Search and Recovery of Two Downed F15 Aircraft in Columbia River

- Mobilization of initial vessel within 12 hours
- Expanded operations to meet demand for expanded search
  - Two vessels towing side scan sonars
  - Vessel with remotely operated vehicle (ROV) to investigate sonar contacts
  - Remote office trailer for data analysis and map generation capabilities
- Two daily briefs to On-Scene Command
- Positioning services for dive operations and crane recovery

Services: Search and Recovery Operations – On-Scene Command Support

Mapping, and Analysis of Cadaver Dog Alerts, Sonar Contacts, and Recovery Items



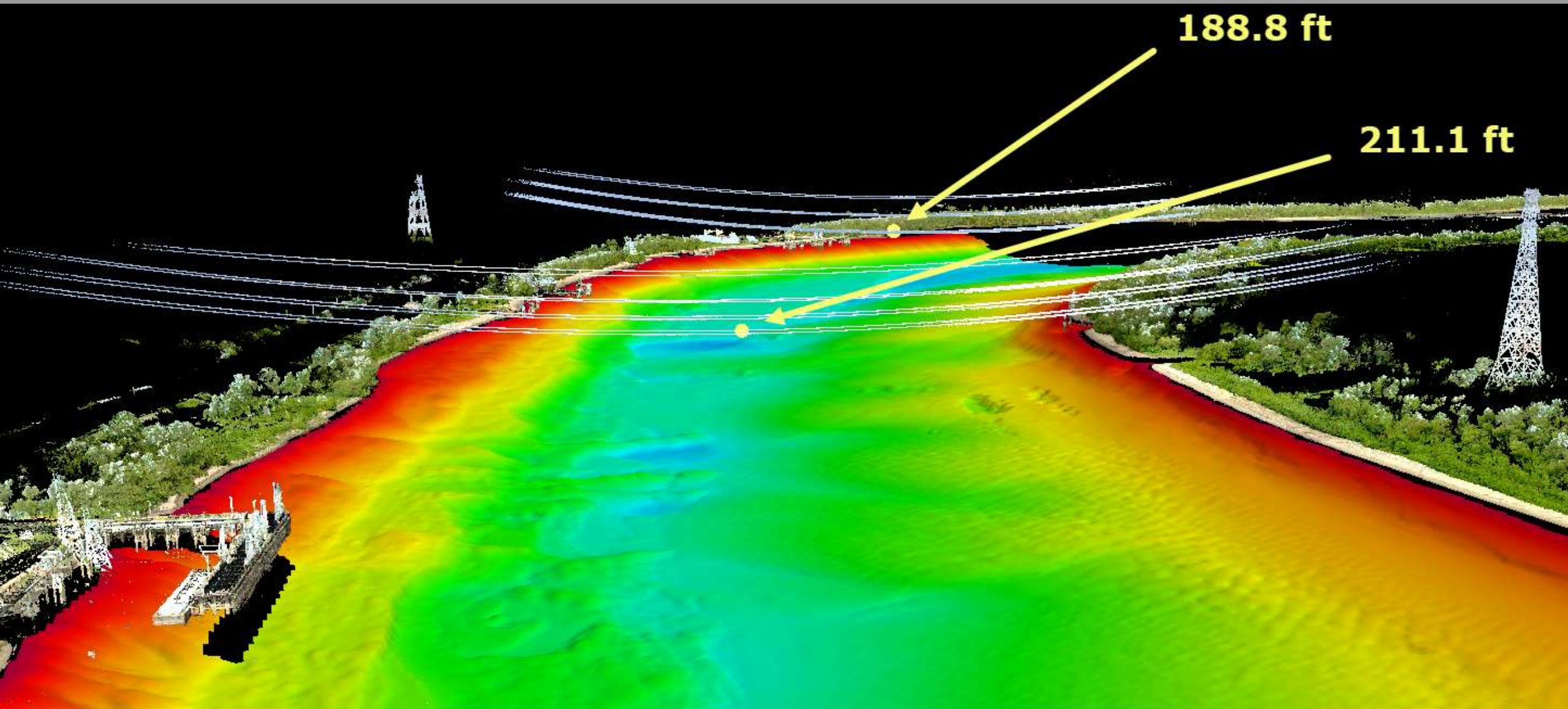
Services: Search and Recovery Operations – On-Scene Command Support

Positioning, Mapping, and Documentation of Recovery Items

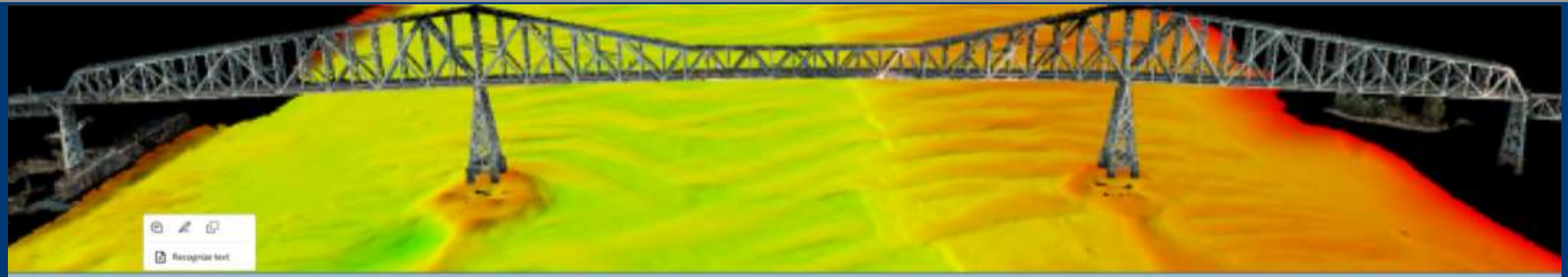
- Victims recovered
- Aircraft recovered 98% by weight
- Missils and guns recovered
- Final incident report recommended a mobile data processing facility with GIS capabilities be required for future military search operations

INSTRUMENTATION: Vessel 3D Laser Scanner and Multibeam Bathymetric Sonar

Nautical Charting of River Depths and Vertical Clearances

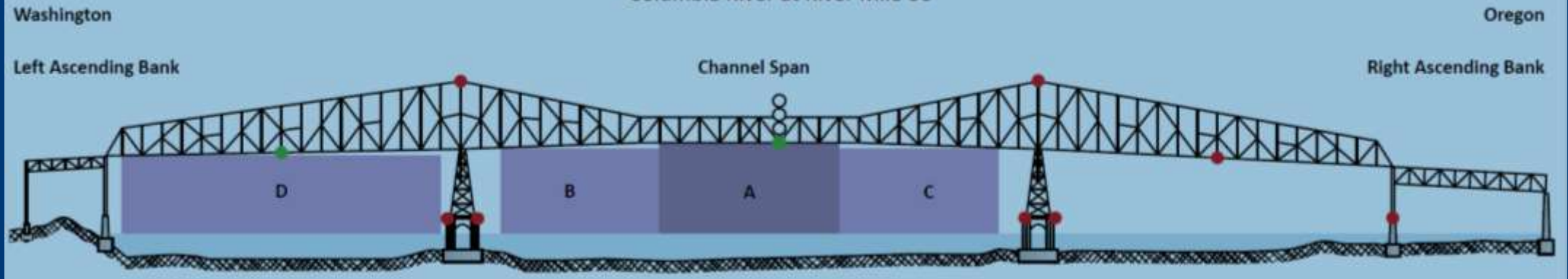


Nautical Charting of River Depths and Vertical Clearances



Lewis and Clark Bridge

Columbia River at River Mile 66



SIMPLIFIED DIAGRAM, NOT TO SCALE

VIEW LOOKING UPRIVER

Height at Primary Channel (A) Light is 196.2 feet/59.8 meters

Height at Secondary Channel (D) Light is 168 feet/51.2 meters

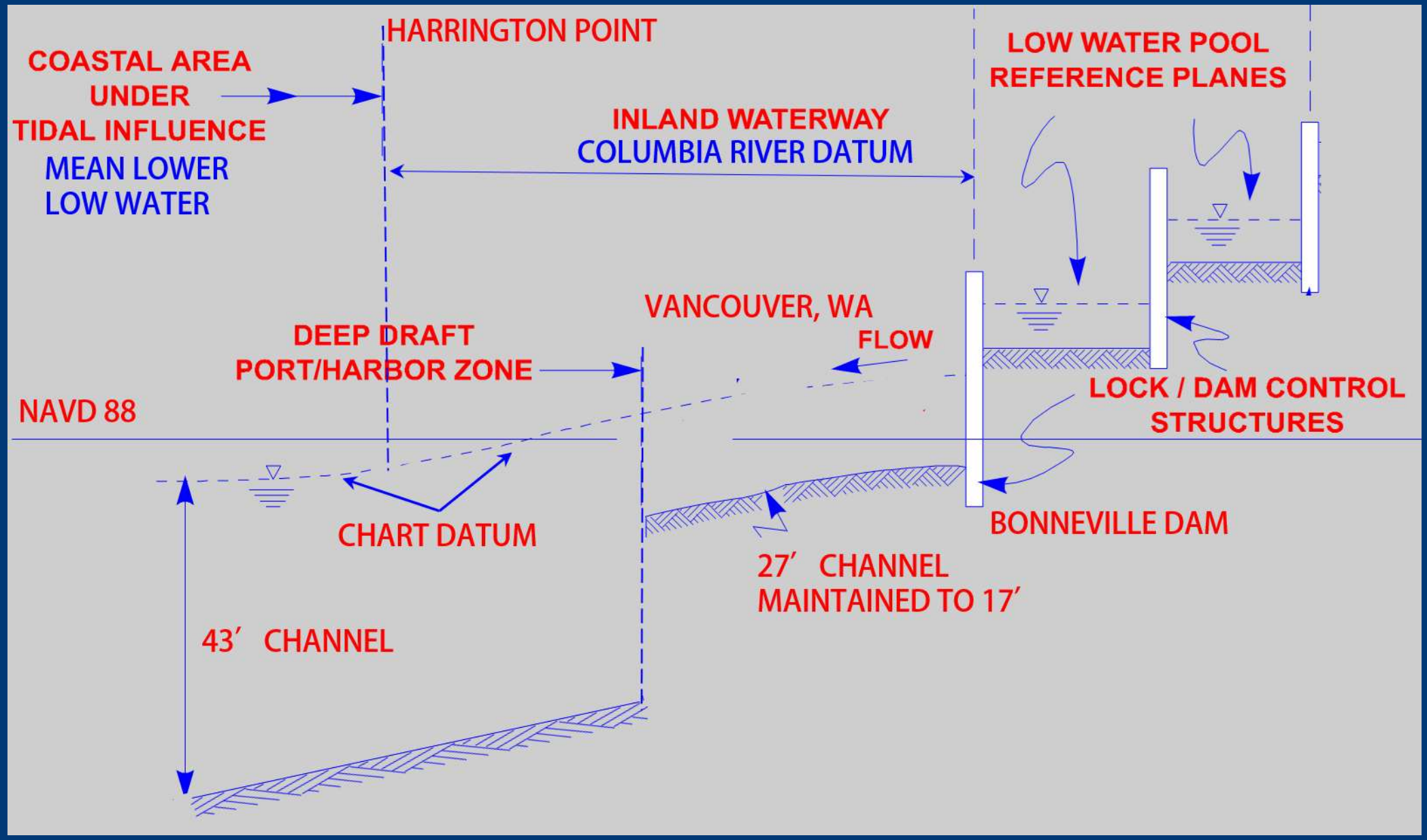
Navigational lights

	Vertical Clearance		Horizontal Clearance	
Segment	Feet	Meters	Feet	Meters
A	194.9	59.4	359.9	109.7
B	187.0	57.0	374.7	114.2
C	187.0	57.0	374.7	114.2
D	158.1	48.2	674.9	205.7

Clearances relative to Columbia River Datum (CRD)

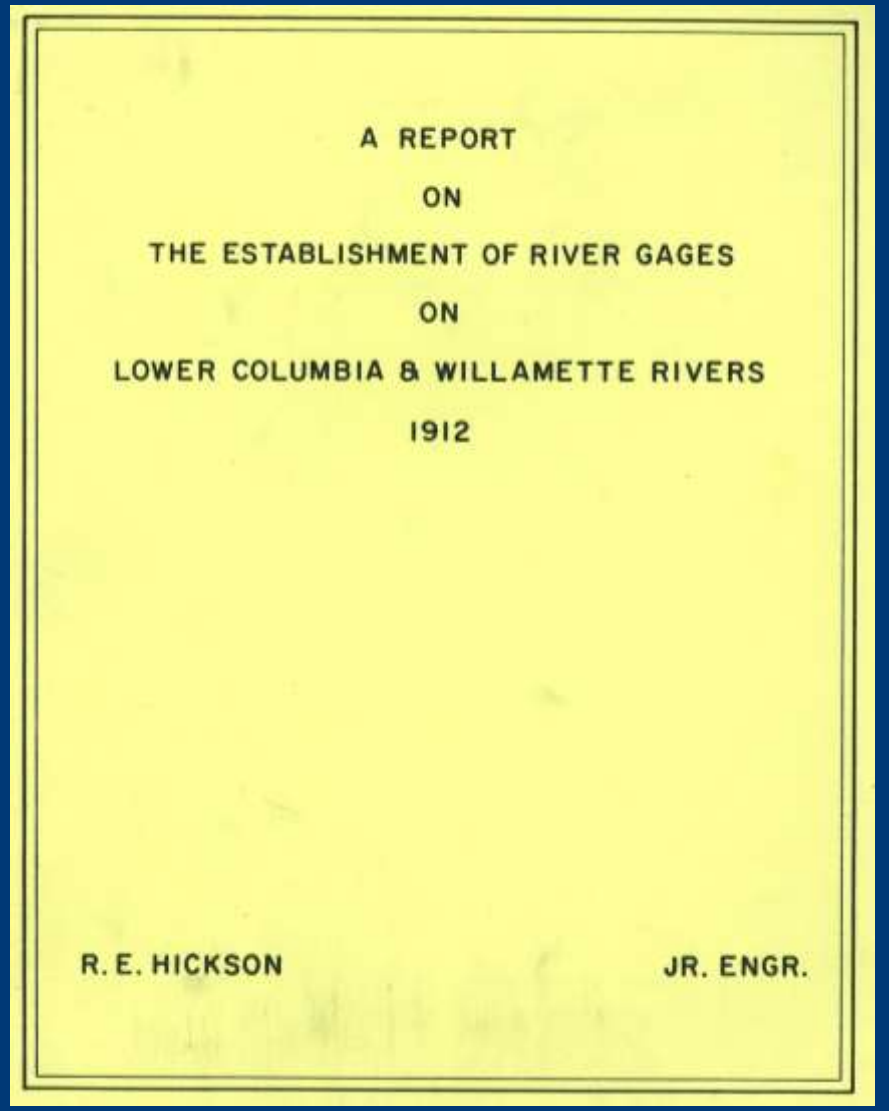
Navigation Vertical Datums on Columbia River (Chart Datum)

- Reference datum for navigation (depths)
- Reference datum for heights (clearances)



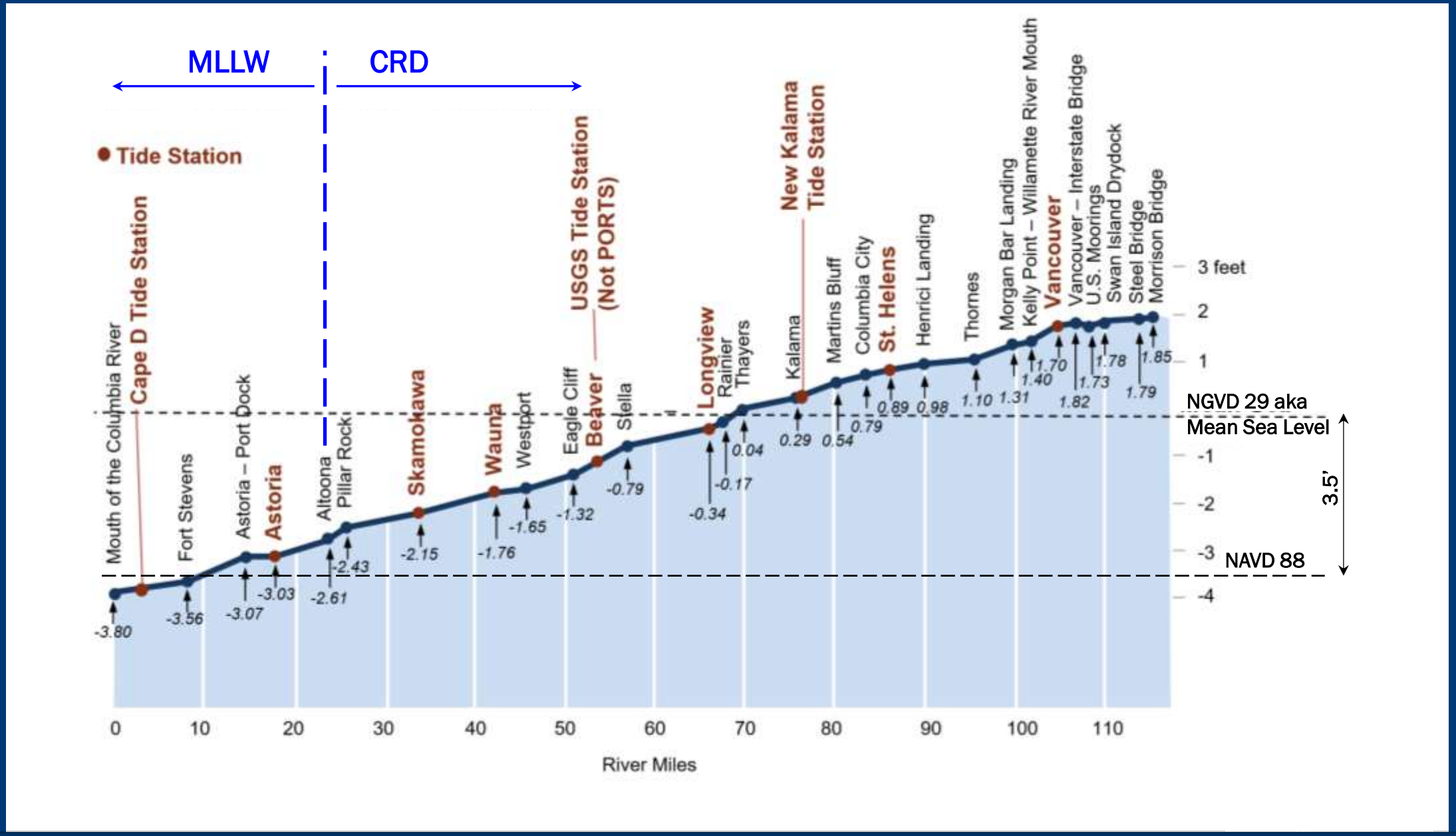
Columbia River Datum (CRD)

- Gradient vertical datum for navigation based on observed low water at various points along the Columbia River
- Defined by R.E. Hickson from the Portland District U.S. Army Corps of Engineers in 1912.
- Refined and related to NGVD29 in the 1950's.
- Portland District published *Columbia River Datum Elevations CL-03-116* which defined CRD and Ordinary High Water relative to River Mile in 1978.
- Currently defined relative to NAVD88.


A REPORT
ON
THE ESTABLISHMENT OF RIVER GAGES
ON
LOWER COLUMBIA & WILLAMETTE RIVERS
1912

R. E. HICKSON JR. ENGR.

Columbia River Datum (CRD): Gradient datum



Support Services for Transiting Ships with High Air Draft

Static air draft surveys and dynamic air draft monitoring for transiting Columbia River

Air Draft computed by taking GNSS height relative to CRD using DEA model, adding height to top of mast, and subtracting tide from NOAA tide stations at Skamokawa, Wauna, and Longview.

Longview Tide = 2.1’ CRD

Bridge Air Gap 195’ – 2.1’=192.9’

Ruby Air Draft 184.38’ at 8 kts SOG

Clearance = 8.5’

Celebrity ECLIPSE

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MARINE SERVICES

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